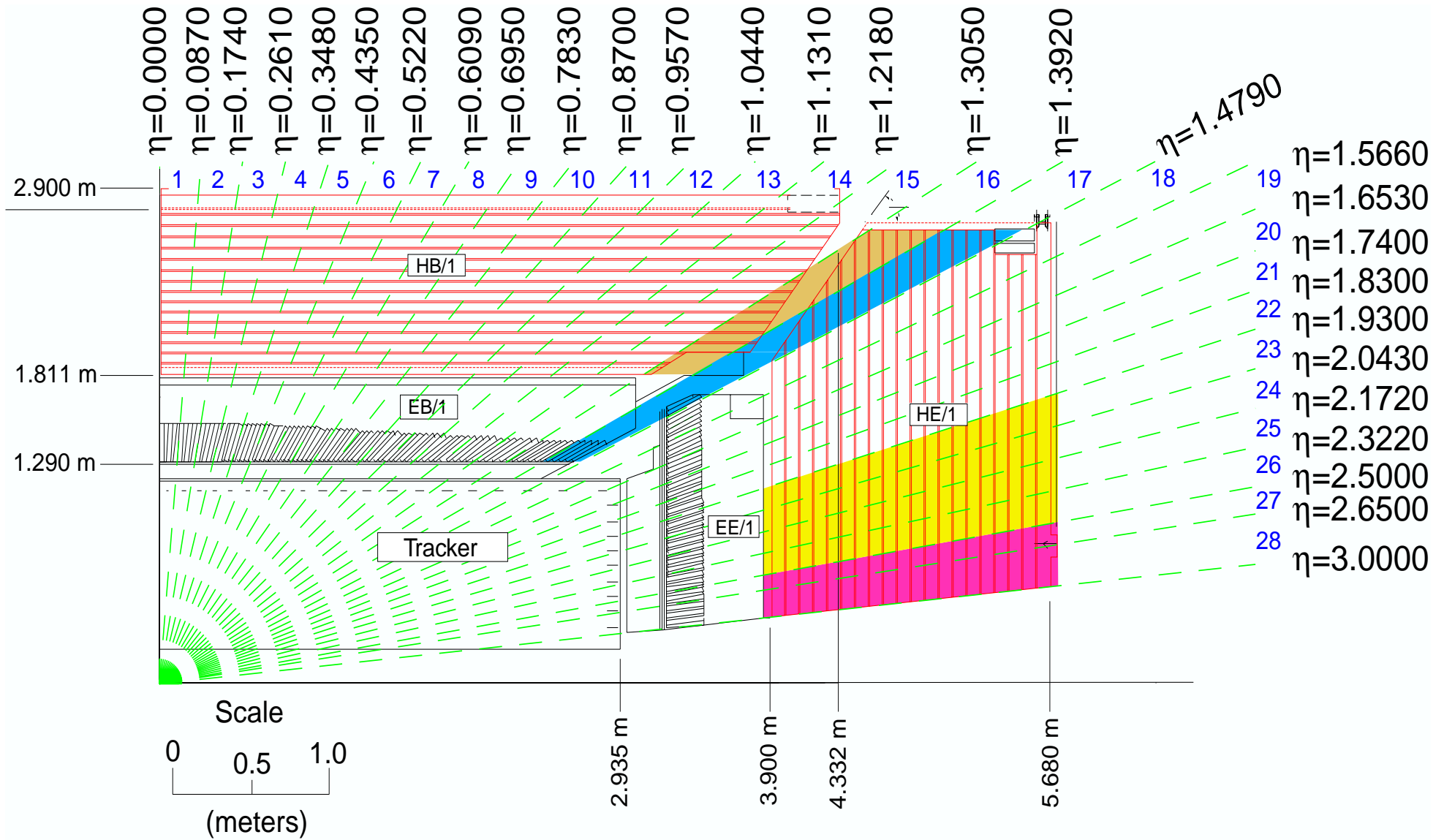


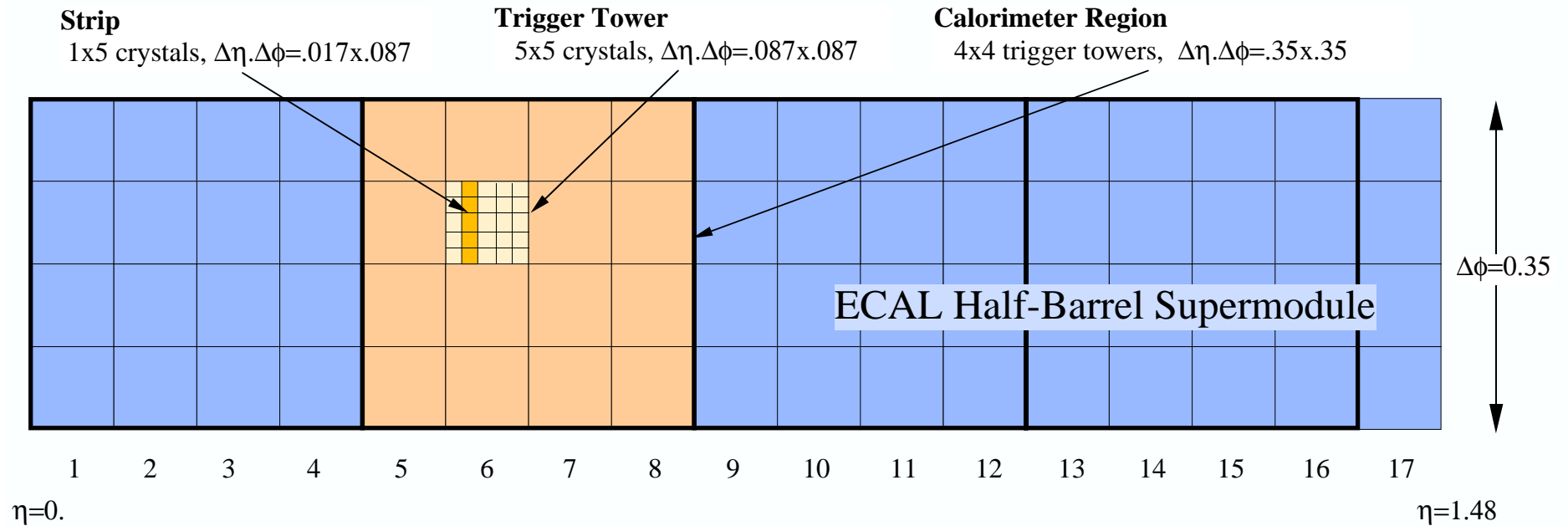


# Calorimeter trigger tower layout





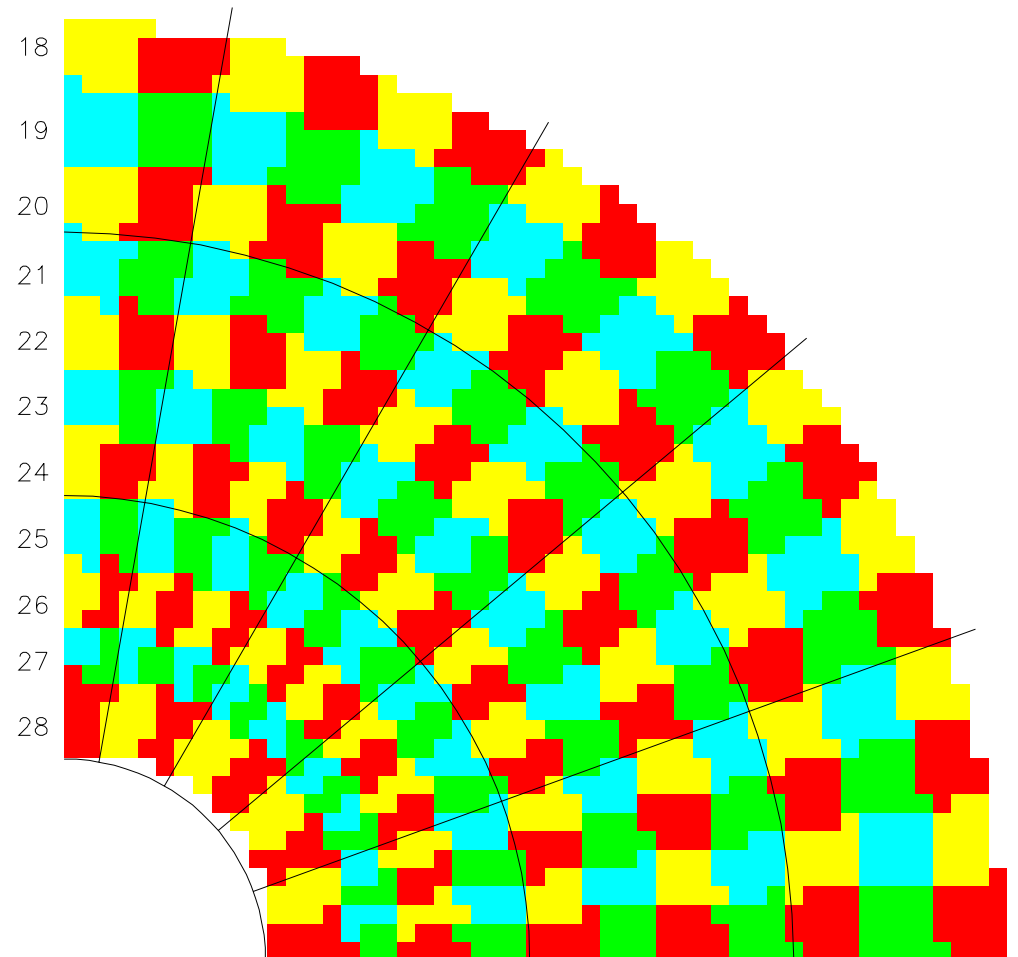
# Calorimeter trigger towers in barrel



**Fig. 3.4:** Calorimeter trigger tower layout in one ECAL half barrel supermodule. The trigger towers are organized in calorimeter regions of 4x4 towers. Tower 17 is integrated with the endcap towers 18, 19 and 20 in calorimeter trigger regions.



# Calorimeter trigger towers in endcap

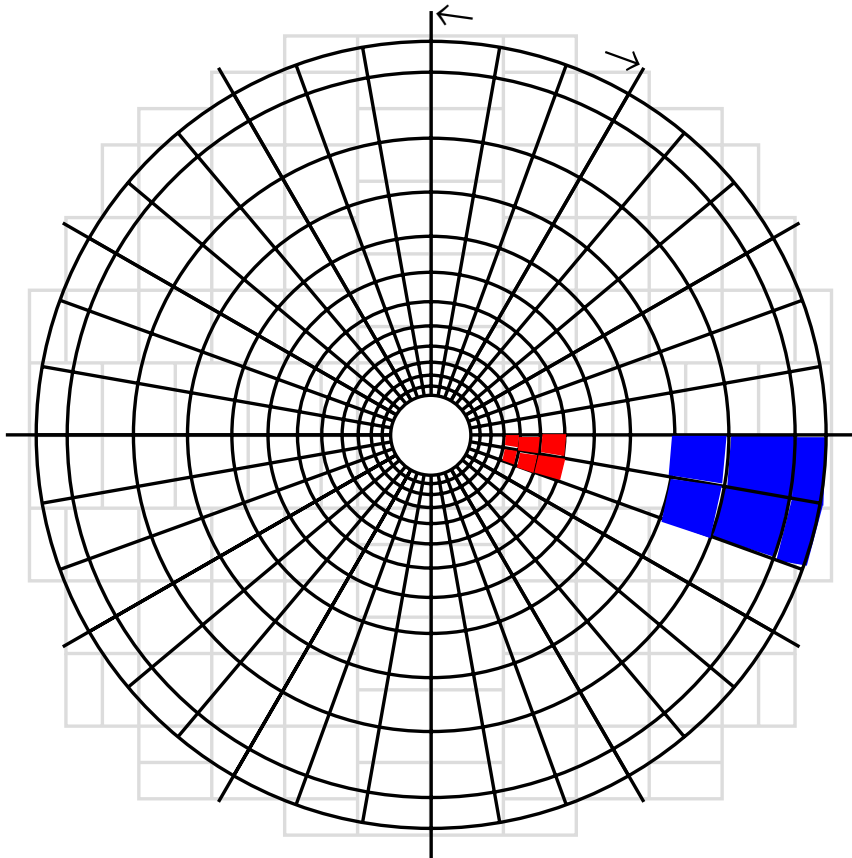


**EE crystals grouped to match HE divisions**

- At high  $\eta$ ,  $\Delta\eta$  is larger to match shower size
- $\Delta\phi$  is kept constant to help trigger system layout



# Calorimeter trigger towers in HF



2 CMS HF Calorimeters mapping onto  
Trigger System HF Crate

*Readout segmentation:  $36\phi \times 12\eta \times 2z \times 2F/B$*

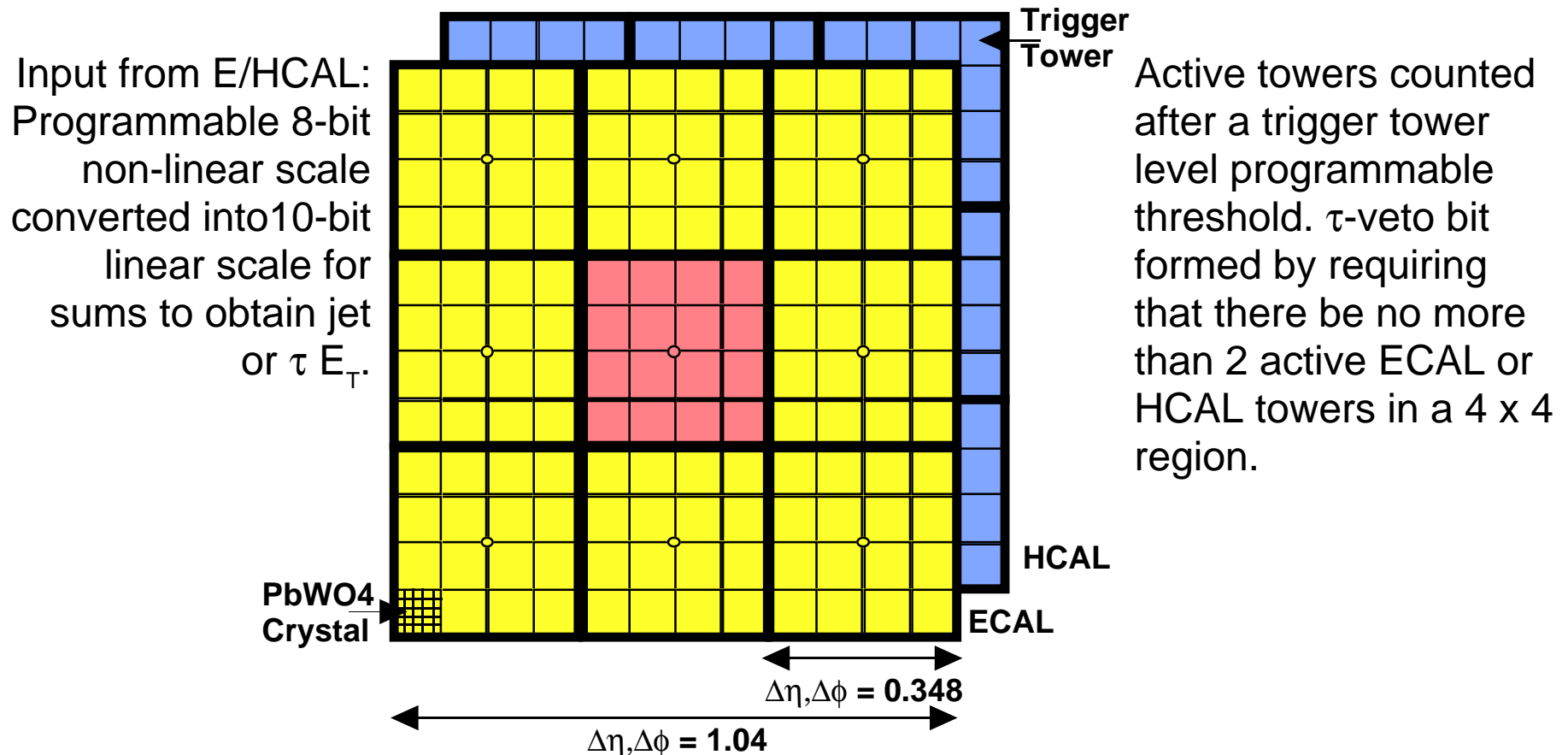
*Trigger Tower segmentation:  $18\phi \times 4\eta \times 2F/B$*

## HF included seamlessly with EB/EE, HB/HE

- HF towers have same  $\Delta\phi$  and similar  $\Delta\eta$  as 4x4 central towers
- Used in jet algorithm
- Used in missing  $E_T$  calculation



# Jet and Tau Algorithms



## Jet or $\tau E_T$

- 12x12 trigger tower  $E_T$  sums in 4x4 region steps with central region  $>$  others
- $\tau$  algorithm (isolated narrow energy deposits)
  - Redefine jet as  $\tau$  jet if none of the nine 4x4 region  $\tau$ -veto bits are on

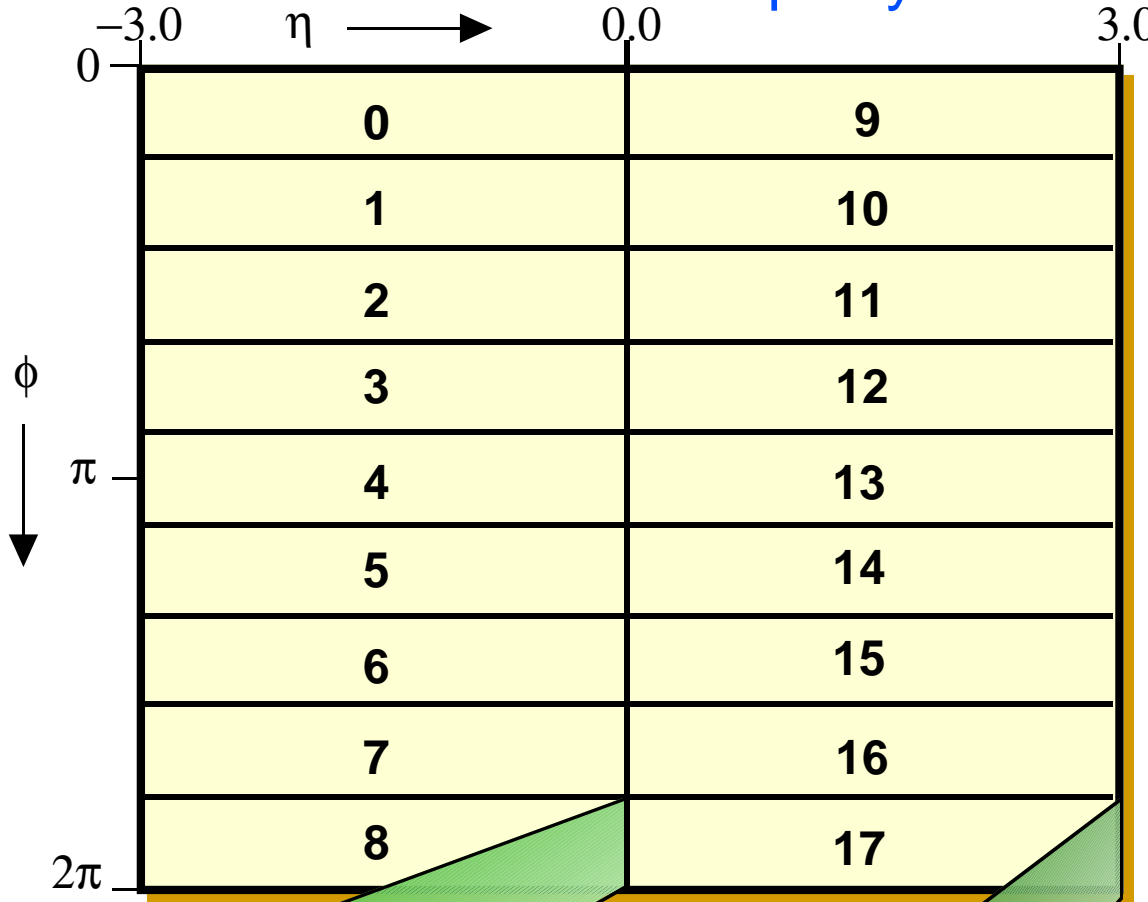
## Output

- Top 4  $\tau$ -jets and top 4 jets in central rapidity, and top 4 jets in forward rapidity



# Regional Calorimeter Trigger Mapping

Central Rapidity : Includes Electron Trigger



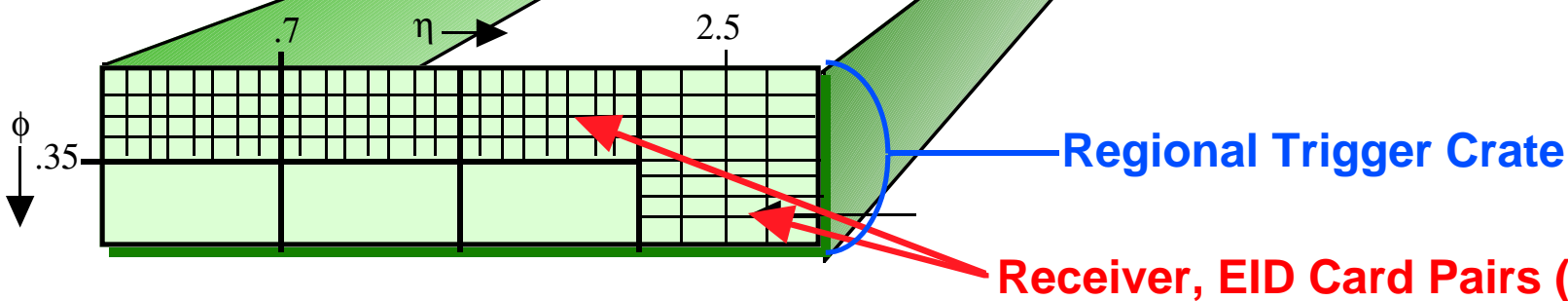
18 crates for barrel and endcap

Each crate covers  $0.7\phi \times 3.0\eta$

Each Receiver, Electron ID card pair covers  $0.35\phi \times 0.7\eta$  (somewhat larger  $\Delta\eta$  at high- $\eta$ )

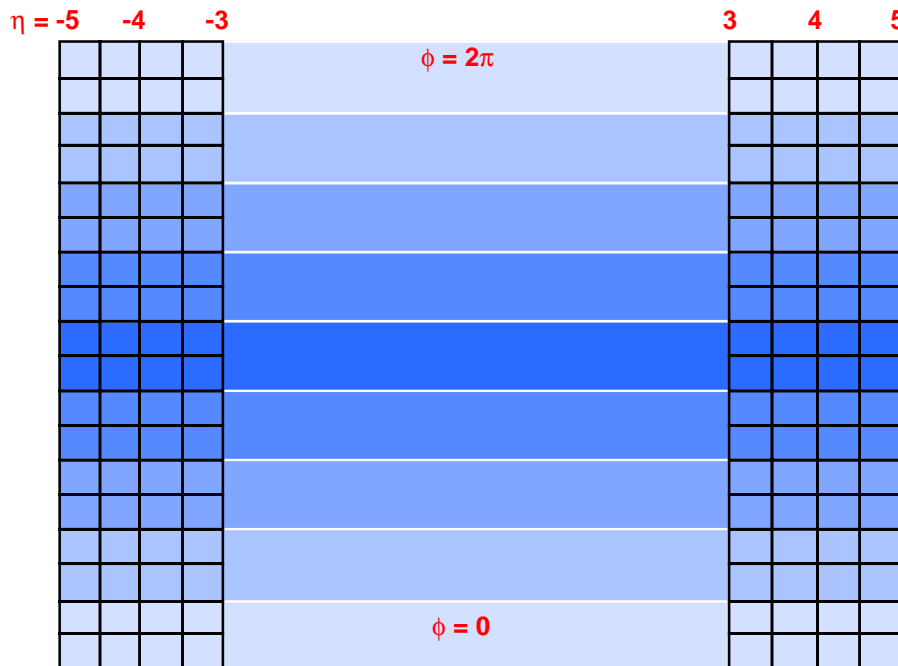
1 similar crate without EID for HF

1 similar crate for jet clustering





# Seamless Jet Trigger Mapping



Single HF crate covers both HF ends  
18 Regional crates cover central rapidity

